

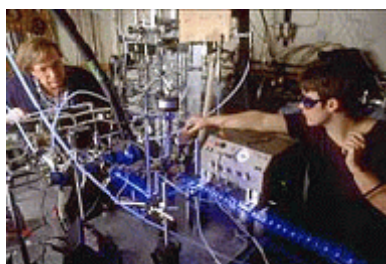


Aeronomy Laboratory

Understanding our complex atmosphere



A NOAA researcher makes observations of chlorine-containing gases during field experiments in Antarctica.



Aeronomy Lab scientists conduct laboratory experiments to study the reactions and properties of atmospheric gases/particles that are important in air quality, ozone depletion and climate.



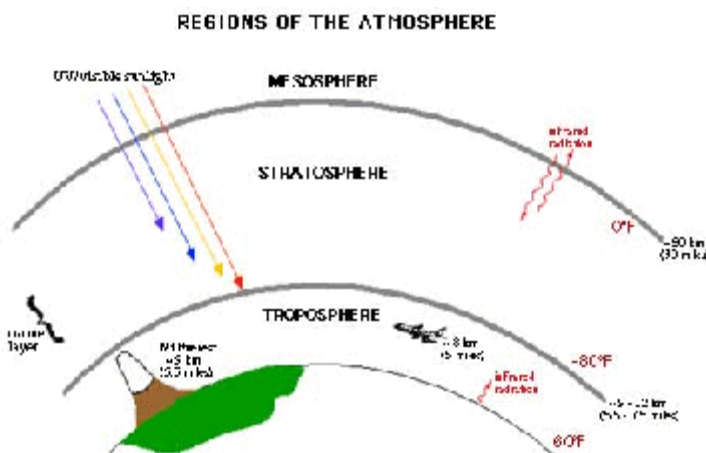
Studying the fundamentals of air quality with the NOAA Aircraft Operations Center WP-3D aircraft.

What does the Aeronomy Laboratory do for the nation?

The Aeronomy Lab's research findings provide a sound scientific basis for decisions made in industry and government related to ozone layer protection, air quality improvement, and climate change understanding.

This lab conducts scientific research aimed at understanding the fundamental chemical and physical processes of the Earth's atmosphere. This research concentrates on the lower two atmospheric layers known as the troposphere and stratosphere. Both the troposphere and the stratosphere have important direct and indirect effects on the well-being of humankind. In this century, it has become increasingly clear that humans are influencing the chemical composition of the troposphere and the stratosphere in ways that can impact conditions at the Earth's surface.

Aeronomy Lab scientists use field, modeling, and laboratory approaches to study Earth's atmosphere and climate. The Aeronomy Laboratory plays leading roles in producing "state-of-the-science" assessment reports for use by national and international decision makers.



Recent Accomplishments:

- Developed and applied a new method to provide real-time analysis of the chemical composition of individual atmospheric particles. **Payoffs:** *The findings alter our picture of the aerosols' optical and nucleation properties, with implications for estimates of the effects of aerosol particles on climate and the ozone layer.*
- Discovered new factors that determine regional air quality. **Payoffs:** *The research is helping to delineate the relative influences of emissions from natural vegetation, agriculture, transportation, and power-generating plants on air quality, and will be input to the development of scientifically sound strategies for air quality improvement.*

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- Filled key gaps in the understanding of the summertime polar ozone layer. ***Payoffs: The “whole picture” of polar ozone is now coming into focus, as described in a summary paper published by the Aeronomy Laboratory in Science (9 July 1999).***
 - Played extensive roles in leading, authoring, and reviewing two international scientific state-of-understanding assessments. ***Payoffs: The documents provide key input to pending national and international decisions regarding the ozone layer and the rapidly growing aviation industry.***

What's Next for the Aeronomy Laboratory?

Science Challenges in the next 5-10 years:

- Ozone Layer
 - What is the impact of the growing number of very short-lived chlorine-containing substances?
 - How best can we detect and interpret the recovery of the ozone layer?
 - How will climate change affect the ultimate recovery state of the ozone layer?
 - How do changes in the ozone layer affect climate, and vice versa?
- Regional Tropospheric Chemistry
 - What will be the impact of growing Asian emissions on the air quality of the Western U.S.?
 - What processes are relevant to the forecasting of regional air quality?
 - What controls the ozone “background”, and how will proposed stricter regulations affect it?
 - What causes fine particles in the atmosphere to develop properties that trigger public health degradation?
- Climate Change: Trace Species, Radiation, and Clouds
 - How well can we characterize the role of the various atmospheric trace gases in the radiation budget?
 - How well do we understand the role of aerosol processes in controlling radiation, the production of clouds, and the alteration of atmospheric chemical composition?
 - How well do we understand the distribution and changes of atmospheric water vapor?

Research Partnerships:

The Aeronomy Lab works with the University of Colorado's Cooperative Institute for Research in Environmental Sciences (CIRES) which was established in 1967 to provide a setting for collaborative research and teaching in the wide-ranging disciplines of the environmental sciences. CIRES is a NOAA joint/cooperative institute and supplies support to facilitate collaborations among scientists at the University of Colorado, NOAA, and other institutions.

Budget and Staff:

The Aeronomy Lab is a \$12.2 million laboratory (\$5.8 million of NOAA base) located in Boulder, Colorado with a staff of 117, including 45 federal and 62 university employees.



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